

April 20, 2007

Dr. Gregory J. Thorpe, Ph.D., Director
Project Development and Environmental Analysis Branch
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

SUBJECT: Supplement to the 2005 Supplemental Draft Environmental Impact Statement and Draft Section 4(f) Evaluation for NC 12 Replacement of Herbert C. Bonner Bridge (Bridge No. 11) over Oregon Inlet, Dare County, North Carolina; TIP Project No. B-2500; FHW-E40339-NC; CEQ No.: 20070072

Dear Dr. Thorpe:

The U.S. Environmental Protection Agency Region 4 (EPA) has reviewed the subject document, and is commenting in accordance with Section 309 of the Clean Air Act and Section 102(2)(C) of the National Environmental Policy Act (NEPA). The North Carolina Department of Transportation (NCDOT) and the Federal Highway Administration (FHWA) are proposing to replace the Herbert C. Bonner Bridge across Oregon Inlet in Dare County. Bonner Bridge was built across Oregon Inlet in 1962 and is approaching the end of its reasonable service life. The bridge is part of NC 12 and provides the only highway connection between Hatteras Island and Bodie Island.

A Supplemental Draft Environmental Impact Statement (SDEIS) was issued in September of 2005. The Draft Environmental Impact Statement (DEIS) was issued in November, 1993. A preliminary Final EIS (FEIS) was prepared in 1996 but was not formally released. However, the preliminary FEIS was distributed to numerous Federal and state agencies in May 2001 for informal review and comment.

The proposed project has been in the NEPA/Section 404 Merger Process since July 31, 2002, and EPA has been involved with this project as a participating team member. An Oregon Inlet bridge replacement alternative needs to be decided in concert with NC 12 issues on Hatteras Island and there are two basic corridors under consideration – the Parallel Bridge Corridor (PBC) and Pamlico Sound Bridge Corridor (PSBC). This Supplement to the SDEIS includes a further variation of the Parallel Bridge Corridor alternatives by adding two phased alternatives (PBC-PA) not previously considered in the SDEIS: PBC with Phased Approach /Rodanthe Bridge and PBC with Phased Approach/Rodanthe Nourishment). The proposed PBC alternatives and Pamlico Sound Bridge Corridor (PSBC) alternatives remain unchanged from the SDEIS. All three of the PBC alternatives and the two Phased Approach alternatives (PBC-PA) would use the existing NC 12 through the Pea Island National Wildlife Refuge (PINWR or Refuge), while the PSBC alternatives would bypass the Refuge entirely.

EPA's environmental review comments and ratings for the SDEIS PBC and PSBC alternatives remain unchanged from the letter dated December 30, 2005. EPA's

review of the Supplement to the SDEIS has identified adverse environmental impacts for the PBC-PA alternatives. The long-term projects (i.e., beyond the standard highway planning period) should be fully considered by decision-makers because of the unique setting and ongoing challenges of managing the PINWR and its essential habitat for migratory waterfowl as well as other threatened and endangered species. Maintaining a reliable transportation corridor along an ever-changing coastal barrier island is a concern particularly with the vulnerability of the PBC alternatives, including the PBC-PA alternatives. While the direct permanent impacts to jurisdictional waters are less for PBC-PA alternatives than the PBC alternatives, there are a number of environmental concerns that remain unresolved. These environmental concerns are more specifically addressed in the enclosure to this letter (See enclosure).

EPA has assigned a rating of EC-2 "Environmental Concerns; additional information is requested" to both of the PBC-PA alternatives because of the potential impacts to jurisdictional waters of the U.S., the long-term effects to water quality, the long-term impacts to the Refuge including the permanent impact to migratory birds, the severe visual impacts to the Cape Hatteras National Seashore, the prolonged impacts to natural resources from construction and maintenance activities, and the severe risk of constructing additional bridges (between "hotspots") along the NC 12 corridor that will be subject to ocean wave conditions. Maintaining a reliable transportation corridor along an ever-changing coastal barrier island is a concern particularly due to the vulnerability of the PBC and PBC-PA alternatives. In light of the many issues presented in the 1993 DEIS, the 2005 SDEIS and this SSDEIS, EPA recommends a re-consideration of some of the preliminary alternatives that were not studied in detail, including the rehabilitation of the existing Bonner Bridge combined with continued NC 12 maintenance activities and permanent ferry service.

However, with the ongoing vulnerable coastal conditions the most viable, long-term alternative for the NC 12 corridor appears to be the relocation of the roadway off the barrier island system and into the more protected Pamlico Sound. Therefore, based on all the analyses to-date the PSBC alternatives would provide, on balance, the best long-term and reliable solution with the least overall environmental impacts.

EPA will remain an active member of the Merger team for the advancement of this important project and will participate in the NCDOT scheduled Concurrence Point 3 meeting in May of 2007. We also recommend that the transportation agencies continue to explore opportunities to address local concerns for potential socio-economic issues related to reduced paved access to PINWR. Mr. Christopher A. Militscher of my staff, at (919) 856-4206, will be the primary EPA contact for this project.

Sincerely,

Heinz J. Mueller
Chief, NEPA Program Office

Enclosure

cc: J. Sullivan, FHWA-NC

P. Benjamin, USFWS-Raleigh

K. Jolly, USACE-Wilmington District

ENCLOSURE

NC 12 Replacement of Bonner Bridge; Supplement to the 2005 Supplemental DEIS – Detailed EPA Comments

Purpose and Need

EPA does not have additional comments regarding NCDOT's defined purpose and need for the project: (1) to provide a new access to Hatteras Island from the North, (2) provide a viable long term replacement crossing of Oregon Inlet given its extreme natural changes in navigation channel, and (3) provide a facility that will not be endangered by shoreline dynamics long term. These purposes are specific to a project exposed to the storm prone coastline and barrier island dynamics, and should be met to ensure that the 'best' alternative is selected. With regards to the PBC-PA alternatives, EPA is not convinced that these additional alternatives can reasonably meet purpose #3 above. The periodic construction of new bridges along the existing NC 12 corridor at the 'hotspot' locations will most likely be exposed to the full intensity of storms and ocean wave conditions. EPA has attempted to find other bridges in the U.S. (and Worldwide) where permanent bridges are constructed in the 'wave break zone' along barrier island formations. EPA has been unable to find other 'barrier island' bridges that are similarly proposed under the PBC-PA or PBC alternatives.

1991 Feasibility Study Alternatives

EPA is concerned that the transportation agencies may not be giving previously rejected alternatives an equal comparison to the current alternatives under full consideration. As the cost of the bridge replacement options currently under detailed study has increased exponentially within the last few years to more than \$1 billion, the rehabilitation of the existing bridge alternative discussed on page ix of the SSDEIS should be reconsidered. EPA recognizes the potential problems with the existing Bonner Bridge including extensive corrosion of reinforcing steel, major spalling of concrete, extensive pile scour, insufficient ship impact strength, and the narrowing of the navigation span zone due to channel migration. Unfortunately, the continued operation and maintenance efforts to keep the existing bridge minimally 'safe' are also costing millions of dollars each year. EPA has recently learned that FHWA and NCDOT propose to let a \$46 million maintenance and repair contract to keep the existing bridge 'safe' for another 10 years. While the reasons to eliminate this preliminary rehabilitation alternative were valid more than a decade ago, the need for a new structure considering both the significant costs and the potentially severe environmental impacts makes a re-evaluation that more meaningful.

EPA as a member of the Outer Banks Task Force has seen the photographs and other documentation provided by NCDOT on the condition of the existing bridge and the substantial repair measures to keep the bridge minimally safe. EPA is not discounting the challenge of trying to rehabilitate the existing Bonner Bridge and address the issues mentioned above. However, the decision to eliminate this alternative at the feasibility

stage was made more than 15 years ago without the full understanding of barrier island dynamics.

When the Bonner Bridge was first constructed across Oregon Inlet in 1962, the science and engineering concerning the dynamics of barrier islands was not fully known to transportation officials. EPA has been unable to find a similar structure located along a barrier island anywhere else in the U.S. or the worldwide. Since the time it was initially constructed, it is has become apparent to a number of highly regarded scientists, engineers and other interested parties contracted by NCDOT and FHWA that the effects of building a bridge along a barrier island represents a substantial risk and a huge public investment. As stated in the SSDEIS, “Beach erosion, however, has increased problems with ocean overwash along NC 12 south of Bonner Bridge.... Ocean overwash is expected to continue to be a regular and increasing problem over the life of a replacement bridge”. Increasing the length of the existing Bonner Bridge either through the selection of one of the PBC alternatives or PBC-PA alternatives by miles of new bridges will only increase the future risk and public investment to keep NC 12 open by additional bridging. The planning for the replacement of Bonner Bridge began just 30 years after its opening. The concept that the new bridge(s) located in a parallel corridor (regardless of the construction method or timeframe) will ‘safely’ last 50 or more years into the future is not realistic considering the present condition of Bonner Bridge. Thirty (30) years after the potential replacement of the 2.7 mile new Bonner Bridge, planning for its replacement will need to be made before Phase IV of PBC-PA alternative would even be completed in Post 2030. All of the PBC alternatives will continue to be subject to shoreline erosion, high winds, storm surges, erosive waves, beach overwash, inlet migrations, hurricanes and other extreme conditions.

Similar in some respects to the Rehabilitation alternative, EPA believes that the Ferry alternative should also be reconsidered. Since 2002 when EPA became involved in the Merger process for this project the costs for the replacement bridges alternatives have doubled and in some cases tripled previous cost estimates. Notwithstanding some of the significant potential environmental and socio-economic impacts from providing a reliable ferry service between Bodie Island and Hatteras Island, North Carolina currently has one of the finest ferry services in North America. The Ferry alternative would mostly likely have a significant impact to the bay bottom environment from dredging the required navigational channel as well as some substantial impacts to wetlands. The Ferry alternative would also potentially reduce the level of service across Oregon Inlet and increase emergency evacuation time. It would also have a potential economic impact to Dare County. Nonetheless, the potential magnitude in cost increases and significant environmental impacts to PINWR from the bridge replacement alternatives makes its complete elimination from further detailed study possibly premature. NCDOT currently maintains a reliable and much longer ferry service between Swan Quarter and Ocracoke Island and Cedar Island and Ocracoke Island. An expanded, robust and reliable ferry service as well as other economic opportunities could make this alternative more attractive than a ‘strict bridge replacement’ alternative. Cost estimates for operating a ferry service to the north end of Hatteras Island including regular maintenance dredging are estimated by NCDOT and FHWA at \$500,000,000, which is more than \$100,000,000

less expense than the PBC Road North/Bridge South alternative (Page 2-24 and Table 2-1). Considering expert opinions from renowned scientists contracted by NCDOT and FHWA, any significant storm event that hits the project study area at the correct angle with a certain duration and/or intensity could cause major breaches along NC 12 at the hot spots. Not counting damaging 'Northeasters' like the recent one on April 15th, there have been 46 hurricanes to hit the N.C. coast in the last 150 years (Riggs, NC Climate Change Commission, 2006). On average, that is almost one hurricane every three years. At a minimum, 'emergency ferry service' should be considered between Bodie Island and Hatteras Island as a contingency for any of the PBC alternatives and realistic costs projected for these contingencies. The extended construction timeframes for new bridges as well as executing emergency roadway repairs for the PBC alternatives should require that very specific contingency plans be made part of this overall EIS analysis.

PBC-PA Alternatives

The PBC-PA Rodanthe Bridge alternative would utilize four phases to construct NC 12 as a bridge for the entire length of the project (i.e, Bodie Island to Rodanthe) except for 2.1 miles in the southern half of PINWR. The PBC-PA Rodanthe Nourishment alternative would be again a phased approach for construction with the exception that beach nourishment would take the place of a bridge option near Rodanthe. From Section 2.2.2.4 of the SSDEIS, it appears that the total construction time frame is estimated to be 12.5 years of active construction over the first 20 years of the phased project. These post-Phase I (Current TIP cycle, 2007-2013) phases, include approach roadways, beach nourishment activities, new access frontage roads near Rodanthe, etc. Considering responses to weather-related overwash conditions at the Rodanthe 'S' Curves Hot Spot, Sandbag Area Hot Spot, Canal Zone Hot Spot during the proposed construction phases, PINWR would be subject to disruptions and intensive human activities for a majority of the time over the next 20 years.

As noted during EPA's review of the 2005 SDEIS, NCDOT and FHWA continue to propose two typical sections for the two basic corridor alternatives. For PSBC, the typical section is two 12-foot travel lanes and two 8-foot shoulders. For the PBC alternatives, including PBC-PA alternatives, the typical roadway section is two 12-foot travel lanes and two 8-foot shoulders. However, the typical section for the Oregon Inlet bridge for the PBC alternatives would provide two 12-foot lanes and two 6-foot shoulders. EPA is uncertain as to why there are two different designs for the replacement bridge structure and the NC 12 bridges, especially considering safety issues for bicycles and pedestrians.

The SSDEIS addresses the potential for a breach to occur at various locations along Hatteras Island (the 'Hot spots'), depending upon the alternative selected. It is very likely that the placement of bridge pilings out in the ocean or in the near shore area may cause significant scouring that could lead to additional breaches or much greater breaches during storm events. The PBC-PA alternatives are designed and planned for addressing the 'historic' hot spots, not their accelerated formation or the increased size of new inlets along Hatteras Island.

On page 5-6 of the SSDEIS, there is a discussion of impacts to PINWR. It is noted that the SSDEIS clearly identifies that the PBC-PA alternatives cause 'substantial visual intrusion' into the landscape of the Refuge, including the portions that contribute to the Refuge's National Register eligibility. This section also describes the temporary and permanent impacts to the Refuge, including construction noise from driving or jetting piles and land disturbance. There are also localized impacts to the Refuge from PBC-PA alternatives to air quality from diesel equipment exhaust, lighting impacts during nighttime construction, the relocation of utilities, etc. The SSDEIS states on page xxiii that telephone and electrical lines along existing NC 12 will likely need to be moved one or more times between now and year 2060. However, it is not clear whether these costs were included in the costs of the PBC and PBC-PA alternatives. It is important to note that it is less likely that utilities will need to be moved for the PSBC alternatives.

On page vii of the SSDEIS, there is a discussion concerning the proposed 25-foot vertical clearance of the bridges associated with PBC-PA alternatives. This discussion needs to be included for all of the PBC alternatives and reflected in the costs for the different alternatives.

Jurisdictional Wetland Impacts

Permanent jurisdictional impacts for the PBC-PA Rodanthe Bridge and PBC-PA Rodanthe Nourishment alternatives are 3.11 acres and 3.08 acres, respectively. Both alternatives include 12.45 acres of temporary impacts to jurisdictional waters of the U.S. While permanent impacts to wetlands have been substantially reduced from the PBC alternatives by proposing the PBC-PA alternatives, the temporary impacts are greater. These 'temporary impacts' to wetlands from the PBC-PA alternatives including temporary traffic maintenance roads which may be quite long-lasting due to repeated compaction and disturbance. While technically these impacts are not permanent fill in wetlands, these temporary impacts will cause the general degradation of these high quality systems. In addition, the duration of construction impacts have also been extended over a much greater time frame, thereby, increasing the risk of other potential impacts.

One significant environmental concern that EPA has with the PBC-PA alternatives is the potential for leakage and spillage of oil and accidental releases to waters of the U.S. The longer construction period for the PBC-PA alternatives increases the probability that a spill or release of hazardous materials will occur into jurisdictional waters from all of the heavy equipment. Considering the sensitive ecosystem of the coastal wetlands in the project study area, even a minor spill could have significant adverse effects to wildlife and recreational activities such as surfing and fishing. As a general rule, it is far less costly and difficult to clean up an oil spill in a more placid bay/sound system, than it is in an ocean or near shore condition. Spilled oil could be spread much farther and faster near the beach and wave areas.

The waters in the project study area are classified as Class A Salt Waters, with a

supplemental classification of High Quality Waters (SA-HWQ). The SSDEIS notes that the PSBC alternatives increase the amount of highway storm water runoff. However, the SSDEIS does not describe the appropriate designs and methods that can ameliorate these additional amounts. On page 4-28, the SSDEIS states that the PBC-PA alternatives could also permanently affect water quality in the near shore area, but diminishes the significance of the storm water inputs by asserting that the flushing and wave action of the ocean will dilute the pollutants. EPA does not prescribe to the use of “dilution as an acceptable solution to water pollution”. The transportation agencies should plan to treat polluted runoff from the PBC-PA alternatives in the same environmentally acceptable manner as it would for all of the other alternatives.

The SSDEIS describes wetlands and open water habitat impacts in Section 4.7.4. EPA notes that there is a great deal of emphasis on shading impacts to SAVs (Submerged Aquatic Vegetation) and open water, especially noting that the PSBC alternatives have the greatest impact. While this is an impact, it is not in the same category of complete and total impact caused by permanent fill in coastal wetlands. Because of the north-south orientation of the barrier islands, NC 12 and the different alternatives, shading may have less of an impact to aquatic resources than what is being implied in the SSDEIS. The SSDEIS does not highlight the difference in the type and severity of the impact and consistently confuses impact information by listing all of the biotic community type impacts with jurisdictional impacts. Furthermore, the predicted permanent wetland impacts on page 4-31 are not consistent for the PBC-PA alternatives described on page 4-41. The discrepancy should be corrected or explained.

Tables 4-1 and 4-2 of the SSDEIS are excellent examples of how information is being confused for the reader, including total fill and pile placement impacts. Biotic communities that are ‘0’ acres impact should be de-emphasized or removed from the tables in order to make the actual impacts for the particular alternatives clearer. Impoundments, wetland man-dominated, wetland overwash, wetland reed stand, upland reed stand, salt flat, brackish marsh and upland black needlerush impacts are all ‘0.00 acres’ and could easily be removed from Table 4-1 to make it easier for the reader to discern the actual permanent impacts. The same issue applies to Table 4-2 for temporary impacts: Seven (7) out of 22 biotic community types are ‘0.00 acre’ impacts.

EPA does not understand why the costs presented in Table 2-1 for wetland mitigation (excluding SAVs) for the PBSC Curved Rodanthe Terminus alternative is substantially higher than the PSBC Intersection Rodanthe Terminus or the PBC-PA alternatives. NCDOT and FHWA should explain this difference and the assumptions used in developing these cost estimates. NCDOT and FHWA should begin consulting with the resource agencies concerning compensatory mitigation opportunities.

PINWR or Refuge Impacts

The PBSC will not result in permanent disturbance to Significant Natural Heritage Areas (SHNA) as identified by the North Carolina Natural Heritage Program (NCNHP). All of the PBC and PBC-PA alternatives will result in permanent and

temporary impacts to the Refuge that has been identified as a SNHA by NCNHP. The PBC and PBC-PA alternatives potentially impact the Green sea turtle (*Chelonia mydas*) and Piping plover (*Charadrius melodus*), and the SSDEIS states that the Section 7 biological conclusion for these two species is “Unresolved”. EPA defers to the U.S. Fish and Wildlife Service (FWS) on formal consultation issues, proposed mitigation and the compatibility permit for the Refuge. The SSDEIS states that the FWS issued the PINWR Comprehensive Conservation Plan in September of 2006.

EPA notes on page 4-37 of the SSDEIS that a potentially unsubstantiated claim is being made regarding PBC-PA alternatives and the Piping plover. The SSDEIS states, “However, shoreline erosion could create Piping plover habitat under the bridges as the shoreline erodes”. The Piping plover nests in open beach areas in a sand depression along the high beach close to the dunes. The nests are sometimes lined with small stones or shell fragments. EPA can not find anywhere in the literature where Piping plovers would nest under a highway bridge. This statement should be corrected in the FEIS or provided with a supporting, relevant literature source.

According to FWS website information on the Piping plover, there are several factors contributing to the decline of the threatened species along the Atlantic Coast, including commercial, residential and recreational development, human disturbance (often curtails breeding success), human pets such as dogs, and developments near beaches that provide food and attract predators. The PBC-PA (and PBC) alternatives would include long-term construction activities (12 out of the first 20 years) that will increase noise, air emissions of mobile source air toxics (MSATs) and other pollutants, nighttime lighting, food sources (and potentially litter) from construction crews, and other related impacts in the right of way and near potential beach nesting habitat. On page 4-37 of the SSDEIS it is stated that the only method of ensuring that Piping plover would not be negatively affected by construction of the proposed project is through monitoring efforts to evaluate changes in the distribution of suitable habitat and the responses of breeding plovers to construction and demolition activities. EPA believes that another method would include intensive surveying efforts prior to construction to identify existing and historic breeding sites and providing and strictly enforcing a substantial buffer to these areas. As further stated in the SSDEIS, the dynamic nature of the Oregon Inlet area results in a continually changing distribution of suitable habitat for plovers. Because of this dynamic environmental condition (which the species has become adapted to over time), efforts to avoid suitable habitat areas in the Refuge is actually the best method to ensuring that the species is not negatively affected. Monitoring the species after construction has begun is potentially too late to avoid or minimize potential impacts. Compared to the PSBC alternatives, the PBC-PA (and PBC) alternatives would appear to have the greatest potential impact to this threatened species.

The SSDEIS states that the PBC-PA alternatives could permanently disrupt feeding and migrating birds within the near shore area once the shoreline erosion places the bridges south of Oregon Inlet in the ocean (Page 4-35). This permanent impact to migratory birds would appear to EPA to be inconsistent with PINWR’s Comprehensive Conservation Plan and the Refuge’s overall mission.

Affect of Bridge Piles on Scour and Longshore Sediment Transport

Section 4.6.3 of the SSDEIS addresses the issues of bridges piles from the PBC-PA alternatives on scour and longshore sediment transport. There are several critical issues unresolved concerning the placement of bridge piles in the near shore area to the ocean. On page 4-21 of the SSDEIS it is stated that scour would be modeled during the final design of bridges associated with the selected alternative to ensure adequacy of foundations as it relates to scour. As stated in the SSDEIS, “Bridge foundations designs must ensure that, even with scour, piles are buried deep enough to support the bridges”. EPA believes that scour modeling for PBC-PA alternatives needs to be conducted prior to the selection of the preferred alternative. This scour modeling is necessary to ensure that the bridges can be safely supported and the depth of the piles is not ‘unreasonable’ or ‘infeasible’. The SSDEIS also states that the presence of piles near the Canal Zone hot spot could accelerate the development of an island breach at this location during storm events. EPA believes that there are technically available laboratory scale models that could confirm this hypothesis. The SSDEIS also acknowledges that scour has been studied extensively in the laboratory but then maintains that field data is lacking (Page 4-23). The SSDEIS then extensively describes the efforts and the excellent source of data from the U.S. Army Corps of Engineers Field Research Facility (FRF) at Duck, N.C.

From this detailed analysis concerning “G/D ratios” (typical distance between piles to pile diameter), there is an acknowledgement that the ‘combined impact of multiple groups over the length of the bridge could result in a scouring effect associated with the entire structure’ (referring to the PBC-PA Phase II Canal Zone hot spot area). The pier modeling assumptions in this analysis indicate that a similar problem would not occur for the Phase II, III and IV bridge locations and that scouring would be localized around the smaller diameter, individual piles. While these assumptions may be realistic for normal wave conditions, specific storm events could change the localized scour prediction and major breaches could be triggered. Regarding longshore sediment transport, the SSDEIS states that it is not possible to draw a one-to-one correlation with what has happened at the FRF’s pier because of the difference in the orientation of the structure with what is being proposed for the PBC and PBC-PA alternatives (perpendicular versus parallel). It is acknowledged that a change in bathymetry could affect cross-shore transport (of sediment) during storm events. There is further recognition in the SSDEIS that the presence of structures (i.e., piles) would accelerate the development of a breach during storm events. The bridge elements in the upland areas are also expected to disrupt normal sand wind-borne transport mechanisms and reduce sediment in the backshore areas of the beach. The questions that concern EPA is not if the normal sand and sediment transport processes will be affected by the PBC and PBC-PA alternatives but to what degree and what are the likely indirect and cumulative impacts associated with these potentially drastic changes to the coastal landscape.

Project Costs and Funding

EPA acknowledges that the transportation agencies have separated the actual

bridge replacement and NC 12 costs from the 'other public costs' as was requested by a number of the Merger team agencies after the issuance of the SDEIS. Page 2-21 of the SSDEIS includes a discussion of Refuge access should one of the PBSC alternatives be selected. If there were a storm-caused breach at the southern end of the Refuge, there appears to be a perception that a ferry service would need to be implemented to get visitors and perhaps their vehicles to and from the Refuge. EPA is uncertain as to under what conditions there would be visitors at the Refuge following a storm event strong enough to cause a breach in the island and NC 12.

Tables 2-1 and 2-2 of the SSDEIS provide the highway cost to 2060 in 'low' estimates and 'high' estimates for the different alternatives. It is interesting to note that the 'low' estimated costs for the PBC-PA alternatives are relatively in the same range as the PSBC alternatives (i.e., \$1.1 to 1.2 billion versus \$1.3 billion, respectively). EPA recognizes the 'unknown' or only partially known information and factors relating to project costs on page 2-15 of the SSDEIS. EPA also understands the issues of the higher inflation factor for the PSBC alternatives, the change in contract type to design-build, etc., which has dramatically increased project cost estimates. EPA acknowledges that the PBC alternatives Nourishment and Road North/Bridge South continue to have the lowest total highway cost to 2060. EPA has previously stated its environmental objections to these two alternatives in its 12/30/05 letter on the SDEIS.

The cost estimates for the road and bridge operation and maintenance to the year 2060 are also presented in Tables 2-1 and 2-2. EPA does not comprehend the method by which these projected costs were forecasted. The operation and maintenance costs for the PSBC alternatives are more than all of the other alternatives and greater than the actual bridge replacement costs for all of the PBC and PBC-PA alternatives. NCDOT and FHWA have projected operation and maintenance costs for the new 18-mile PSBC alternative bridges at approximately \$356,000,000 to the design year at 2060. The PBC All Bridge alternative operation and maintenance cost is estimated at only \$274,000,000 for a 16-mile structure. The total construction cost for all of the PBC and PBC-PA alternative new bridges (16-mile structures) are estimated between \$260,000,000 and \$290,000,000. EPA requests that the detailed assumptions used in developing the operation and maintenance costs be provided to the Merger team agencies at the upcoming scheduled Concurrence Point 3/Least Environmentally Damaging Practicable Alternative (LEDPA) meeting. NCDOT and FHWA should be able to develop realistic cost estimates from other existing long bridges that are along the Outer Banks. EPA recognizes that operation and maintenance costs for a structure within the sound may be more expensive (referring to the 4th bullet comment in Section 2.3.1.3). However, EPA believes that the weather conditions and other storm events are not as severe in the Pamlico Sound as they are on the near beach alternatives and there should be less drastic repairs required for the PSBC alternatives. Also, the typical section for the PSBC alternatives include two 8-foot shoulders and should make roadway access for routine operation, inspection and maintenance activities less difficult and easier than the existing Bonner Bridge and NC 12.

EPA has reviewed the generalized information contained in Section 2.3.4 of the

SSDEIS regarding capital funding. NCDOT and FHWA identify that there may be innovative financing techniques to help fund the proposed project, including the issuance of revenue bonds against one or more long-term sources of revenue. It is cited that many states use innovative techniques to finance large projects or transportation improvement programs, including future FHWA Federal-Aid funds, State motor fuel taxes and the use of local taxes and fees and tolls. EPA is unsure how these capital funding techniques are truly innovative, as many states, including North Carolina, are already using these additional 'non-traditional' funding mechanisms. From past Merger meetings within the past year, EPA understands that the funds allocated in the NCDOT's Draft 2007-2013 Transportation Improvement Program are insufficient to fund the bridge replacement construction for any of the alternatives currently under consideration (i.e., \$207,252,000 TIP FY09 versus \$260,000,000 for PBC Nourishment, Road North/Bridge South, All Bridge and \$294,000,000 for PBC-PA Rodanthe Bridge and Rodanthe Nourishment, etc.). EPA requests that NCDOT and FHWA provide more detailed information on capital funding issues and commitments for the LEDPA meeting.

Sea Level Rise

The SSDEIS does not discuss the potential cumulative and secondary impacts from Sea Level Rise (SLR). This emerging yet documented issue needs to be evaluated fully for the different alternatives in the FEIS. There are now predictions from the N.C. Climate Change Commission concerning SLR and its impacts to the shoreline of North Carolina (A number of papers and presentations can be found through a search at <http://www.ncleg.net/gascripts/documentsites/browsedocsites.asp?>). On page xii of the SSDEIS, historic beach erosion trends were used for the development of the worst-case 2060 shoreline. However, this analysis does not appear to take into account likely future trends due to SLR. The predicted shoreline may not be at the locations that are presented in the SSDEIS. In fact, the 'worst-case' shoreline along Hatteras Island is projected by NCDOT where there may not be a shoreline present or the shoreline will have significantly shifted to the west (Riggs, NC Climate Change Commission, 2006; Page 19) due to SLR. Shoreline forecasts in the SSDEIS apparently did not consider what many scientific experts are reporting on SLR effects to the N.C. coasts. The effects of SLR may also require much more nourishment and dune construction than is discussed in the SSDEIS. The amount and estimated schedule of beach nourishment should be re-evaluated based upon SLR projections within the project study area. The magnitude, costs and duration of these beach maintenance activities may have been substantially under-estimated in the 2005 SDEIS and SSDEIS.

One of the recommendations to the N.C. Climate Change Commission in a recent report (Radar, Implications of Changing and Rising Seas for Coastal NC, 2006) was the proposal to prohibit new public and publicly licensed or permitted infrastructure in flood-prone and storm-surge-prone areas. The construction of new and extended bridges along the existing NC 12 corridor (PBC Alternatives, including PBC-PA Alternatives) would appear to be inconsistent with this technical recommendation.

Other Impacts from the PBC-PA Alternatives

There are acknowledgements in the SSDEIS that there will be other impacts from the PBC-PA alternatives, including for example the change in surfing, fishing and other beach recreational activities, the change in access to the Refuge, reduced flexibility for the USACE to move the dredged channel at Oregon Inlet as the channel migrates, and the visual impact from a raised bridge for approximately 10 miles or more within PINWR (Page 4-10). EPA was unable to find an analysis or discussion within the SSDEIS that addressed the increased safety concerns for vehicle-avian species collisions. Gulls and other seashore birds often use elevated structures for 'floating' on prevailing air currents. Some of these birds would also be attracted to the elevated roadway from litter and uneaten food. The near shore wind currents can be very strong and highly variable and the potential frequency of collisions is more likely with the PBC-PA alternatives than with the PSBC alternatives.

EPA recognizes that a new section on MSATs has been included in Section 4.9.2 of the SSDEIS. EPA has previously stated its concerns about the use of a qualitative type assessment being offered under FHWA's interim guidance. There is some project specific information contained in the SSDEIS, including the estimate that potential MSAT emissions will be 17 percent higher for the PSBC alternatives because of its longer length. This potential increase, however, would appear to be essentially negligible as it relates to human health impacts as there are no near roadway receptors or sensitive populations located in Pamlico Sound. The analysis does not address the potential near-road exposures of fishermen and other users of the Refuge from existing and future MSAT pollutants for the PBC and PBC-PA alternatives. Also, the context of most MSAT research is intended to examine the potential impacts to the human environment, and not to wildlife. Since the project is almost entirely within the Cape Hatteras National Seashore and PINWR, the transportation agencies should further explore this issue with the FWS, the North Carolina Wildlife Resource Commission and other university experts regarding any impacts of toxic compounds and other air pollutants from the project on native wildlife populations.